145.7X18

IMPACT EVALUATION

SADDLEBACK LOOPER

South Tongass National Forest
Ketchikan Ranger District
February 1972

The following remarks are based on observations made by Don Curtis during an examination of insect damaged trees within selected portions of the 1969 saddleback looper outbreak at Connell Lake during the 1971 field season.

Included in the examination was an assessment of damage on 33 temporary plots located along two transect lines and from four 1 X 2 chain permanent plots located within stands of western hemlock that had suffered defoliation during the summer of 1969.

The permanent plots, established in 1970 by Region 10 entomologists, are located in mature stands of western hemlock on moderate south facing slopes. They are being monitored to determine the amount and pattern of deterioration in hemlock stands following a defoliator outbreak.

The purpose of the evaluation was to catalog the amount of damage caused by the saddleback looper and to provide the Ranger District with information that would be useful in planning timber salvage.

I. TECHNICAL INFORMATION

Causal Agent: Ectropis crepuscularia schiff; the saddleback looper.
Host Tree: Tsuga heterophylla (Raf.) Sarg; western hemlock.
Location of Outbreak: Along the west shore of Connell Lake in the Ward Creek drainage near Ketchikan. The damage area is roughly rectangular shaped and approximately 200 acres in size extending from a point one-half mile above the dam site, NW to the base of slide Ridge beyond the Harriet Hunt access road. The area is roughly divided by a small stream that drains into Connell Lake.

Timber Type: Western hemlock is the dominant tree in this area accounting for more than 70 percent of the stand volume. Sitka spruce makes up a minor component of the stand except along the rather flat creek bottom roughly bisecting this area.

Type of Damage: Light to severe defoliation of western hemlock in 1969 resulting in varying amounts of top-kill and tree mortality concentrated primarily on the south and west facing slopes.

II. PROCEDURE

The area was separated into two blocks of 80 and 120 acres each and sampled accordingly. The stratification was made on the basis of stand structure, aspect, and amount of mortality visible from the air.

The assessment of impact consists of estimating the amount of noticeable damage sustained by host trees within these two units. Data was taken from eighteen 1/10 acre and fifteen 1/5 acre circular plots and from the four 1/5 acre rectangular study plots established in 1970. The circular plots, located four chains apart along two separate transects, were established by hand compass and pacing in 1971.

On each plot all hemlock trees above 11.0" d.b.h. were tallied and the following information recorded: d.b.h. to the nearest 2-inch class, number of 32' logs, crown class, damage class, and presence or absence of dwarfmistletoe.

In the larger block a tally of dead and/or severely defoliated dominant and codominant trees within a two chain strip between plots was also recorded.

Five classes of damage based on amount of crown foliage present were recognized. The damage classes used in the evaluation survey and their descriptions are as follows:

1. LIGHT - Less than 25 percent of the old foliage is absent. The crown has a greenish appearance. Any foliage loss is classified as light.

2. MODERATE - Foliage loss is between 26-50 percent. The upper crown usually appears greenish brown.

3. HEAVY - Foliage loss is between 51-75 percent. The upper crown and portions of the lower crown appears mostly brown. Some top-kill and tree mortality is associated with this degree of defoliation.

4. SEVERE - Foliage loss is more that 75 percent. The entire crown is thin and has a grayish-purple appearance. The green foliage present consists primarily of the current years growth. Top killing and/or tree mortality usually results from this degree of defoliation.

5. DEAD - No foliage is present, however, branches, twigs and most twiglets remain. The cambium layer is moist, but beginning to sour. Basal examination often reveals the presence of secondary insects.

III. SUMMARY OF SURVEY

Transect #1 Refer to map of damage area.

18-1/10 acre plots in an 80 acre area.
Number of trees 12" DBH and larger = 89 (50/acre).
Number dead trees 12" DBH and larger = 5 (3/acre).
Existing mortality = 6%
Anticipated mortality over next 3 years = 25%

DBH = 19" @ 2½ logs
Volume/tree = 302 bd. ft. gross
Volume/acre = 15,100 bd. ft. gross

Volume of morality/acre = 906 bd. ft. gross
Total volume of existing mortality = 72,480 bd. ft. gross
Anticipated volume of mortality = 302,000 bd. ft. gross

Transect #2 Refer to map of damage area.

15 1/5 acre plots in a 120 acre area
Number trees 12" DBH and larger = 106 (35/acre)
Number dead trees 12"DBH and larger = 22 (7/acre)
Esixting mortality = 20%
Anticipated mortality over next 3 years = 45%

DBH = 21" @ 3 logs
Volume/tree = 496 bd. ft. gross
Volume/acre = 17,260 bd. ft. gross
Volume mortality/acre = 3,472 bd.ft.
Volume mortality for area 416,640 bd. ft. gross
Anticipated volume of mortality = 934,040 bd. ft. gross

Between Plot Tally on Transect #2

Number dom-codom. trees in damage classes 4 and 5 = 101
DBH = 23" @ 3 logs
Volume/tree = 568 bd. ft. gross
Volume mortality = 57,368 bd. ft. gross

Study Plots Refer to map of damage area.

4 1/5 acre rectangular plots
Number trees 12" DBH and larger = 47 (60/acre)
Number dead trees 12" DBH and larger = 7 (9/acre)
Existing mortality = 15%
Anticipated mortality over next 3 years = 36%

DBH = 22" @ 3 logs
Volume/tree = 532 bd. ft. gross
Volume/acre = 31,920 bd. ft. gross
Volume of mortality/acre = 4,788 bd. ft. gross
Anticipated volume of mortality = 11,491 bd. ft. gross

The diameters were determined by a simple weighted average method rather than by the sum of squares method and therefore are a bit conservative. The individual tree volumes were taken from Table 445.16 in the Timber Sale Preparation and Appraisal Handbook.

IV. DISCUSSION

The results of the evaluation indicate that looper feeding resulted in moderate to severe defoliation over the entire area with tree killing and defoliation most evident in the larger dominant and codominant crown classes.

It is conservatively estimated that more than one-third of the overstory in the entire sample area will die as a result of this outbreak. This includes the trees that are currently suffering severe defoliation (22%) as well as the existing mortality (14%).

The impact of feeding is most pronounced in the 120 acre area on the south and west facing slopes on the east side of the stream near Connell Lake and above the Lake Harriet Hunt access road in the vicinity of the two impact plots. The amount of mortality and the number of severely defoliated trees is approximately three times as great as in the 80 acre unit in the western portion of the outbreak.

The stands on these slopes were apparently more suitable for oviposition and larval feeding because of the greater amount of solar radiation which results in higher temperatures and lower humidity. In addition, these stands appear to be older, are more uniform, contain a greater number of large trees, and are more heavily infected by dwarfmistletoe.

In addition to the direct and anticipated mortality, the looper outbreak has resulted in a less stable stand with increased potential for damage by fire, disease, wind, and other insects. The dead wood from branches, fallen tops and standing snags increases the potential fire hazard during dry seasons and provides abundant material for the production of a variety of wood rotting fungi.

The crown canopy of partially defoliated trees allows more sunlight to reach the understory level increasing the growth of dwarfmistletoe infections and stimulating the growth of residual shrubbery. The ragged and uneven overstory increases exposure to the wind resulting in greater potential for blowdown. The weakened trees are often attracted to a number of secondary insects which could produce large broods and cause additional mortality.

V. RECOMMENDATIONS

1. Clearcut the damaged stand, salvage the existing blowdown, and conduct dwarfmistletoe control at the conclusion of logging. Make provision for maintaining the recreational potential of the area along the northwest edge of Connel Lake.

2. Prepare an Information & Education program informing the public about intended management of this area.

Donald J. Curtis

DONALD J. CURTIS
U. S. Forest Service
Region 10
February 1972

CONNELL LAKE DAMAGE AREA